Fox River Task Force – Operations Subcommittee Report

At the July 24, 2008 meeting of the Fox River Taskforce, the Office of Water Resources agreed to update the report "Operation of Stratton and Algonquin Dams, Fox River, Lake and McHenry Counties", January 2000 commonly referred to as the "Operation Manual". The updated report "Operation of Stratton and Algonquin Dams, Fox River, Lake and McHenry Counties", January 2009 was presented to the Fox River Taskforce on January 21, 2009. This report is available on-line at the IDNR's web site at the following address: http://www.dnr.state.il.us/owr/publications.htm

Modifications to Operation Manual

The update of the January 2000 version of the "Operation Manual" included the following major modifications:

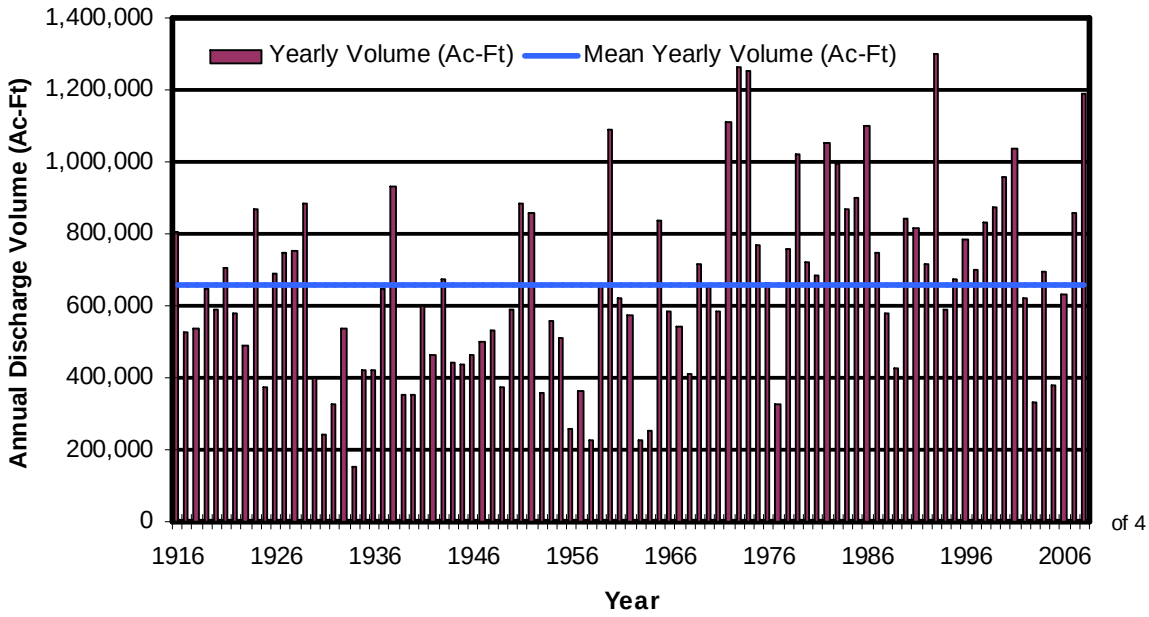
- Better graphics so that report is easier to understand
- New discharge equations from USGS for both Algonquin and Stratton Dam. Based of numerous discharge measurements made since hinged crest gates were installed
- Additional text to describe Operational Objectives for both summer and winter
- Update of statistical analysis in report
- Added table giving relationship between gage height and elevation for 11 gages
- Updated section on "Boating Restrictions" removing any OWR reference to "no-wake" conditions and inserted the Admin Rules language that documents how, why and by whom the river will be restricted to boating

During the January 21, 2009 presentation of the "Operation Manual" a historical perspective of the recent flooding was presented as follows:

Historical Perspective

An analysis of the yearly flow volume measured at the Algonquin gage (Figure 1) shows the total volume of annual discharge as compared to the Mean Yearly Volume of 658,000 Acre-Feet.

Figure 1 **Fox River at Algonquin**



The point being made with Figure 1 is that while flooding in 2008 was severe it was by no means unprecedented. Table 1 lists the four years with the largest annual flow volumes

Table 1

Year	Annual Flow Volume (Acre-Feet)	Deviation from Yearly Mean
2008	1,188,000	80% increase
1993	1,302,000	98% increase
1973	1,261,000	92% increase
1974	1,254,000	91% increase

Figure 2 is the result of analysis that derived the number of days in each year where the flow at Algonquin Dam was above 3000 cfs. The value of 3000 cfs was chosen as the threshold of flooding. Table 2 lists the five years in which the most days above 3000 cfs occurred as measured at Algonquin Dam.

Figure 2

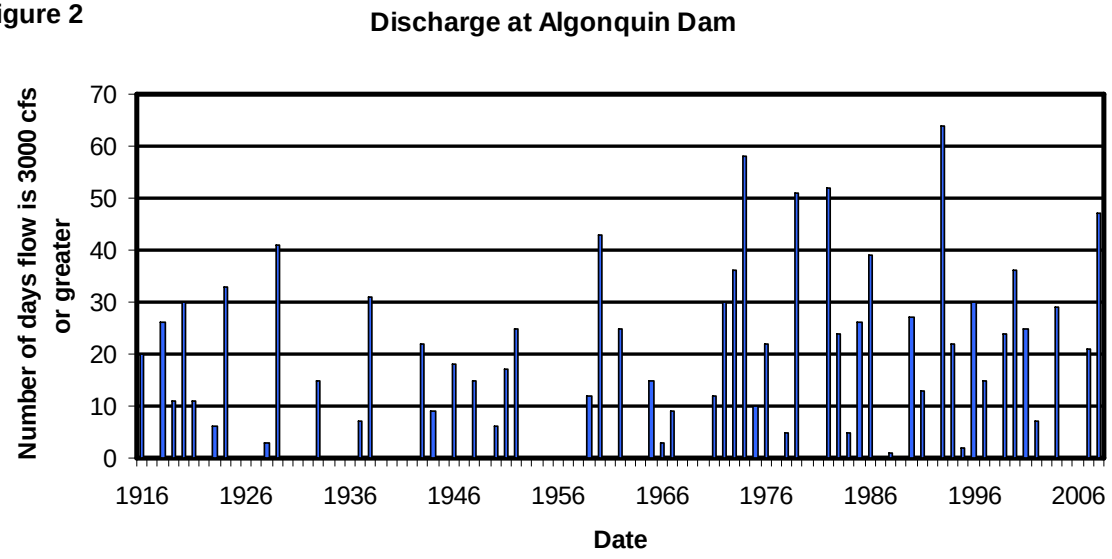


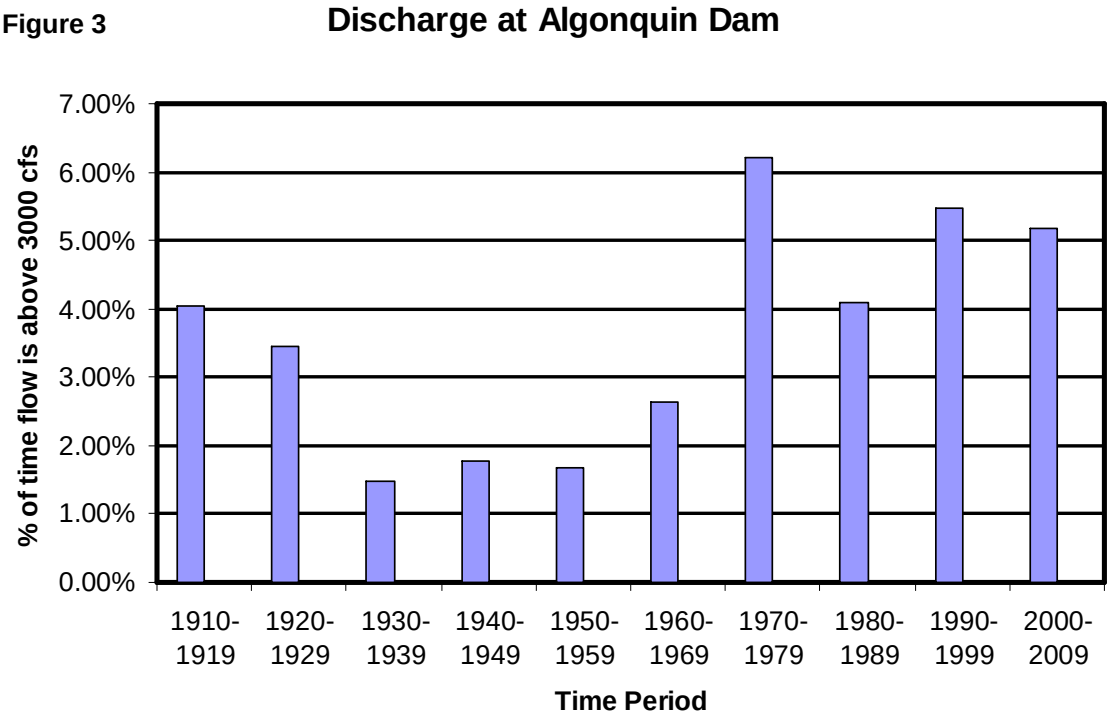
Table 2

Year	Number of Days Flow is Above 3000cfs
2008	47
1993	64
1974	58
1982	52
1979	51

Figure 3 is the results of the same analysis as was performed to derive Figure 2 except that instead of analyzing the number of days the flow was above 3000 cfs

in a year, the analysis was based on the percentage of time in a decade that flow was above 3000 cfs. In terms of flooding frequency and duration, the 1970's were a worst decade for flooding than either the 1990's or the 2000's.

Figure 3



A point for consideration is that from Table 1 2008 had the forth highest annual volume of runoff as measured at Algonquin Dam but 2008 was only the fifth highest year in terms of number of days above 3000cfs. There are various reasons why this variation in ranking might have occurred, some of them are:

- Flows at Stratton Dam may have been more effectively managed
- The use of the hinged crest gates may have been a factor
- Variations in spatial and temporal precipitation amounts

A similar analysis was performed on the gage data for the Fox River at New Munster gage.

An analysis of the yearly flow volume measured at the New Munster gage (Figure 4) shows the total volume of annual discharge as compared to the Mean Yearly Volume of 435,000 Acre-Feet. Table 3 shows the years of the five highest annual flow volumes

Table 3

Year	Annual Flow Volume (Acre-Feet)	Deviation from Yearly Mean
2008	748,000	72% increase
1993	834,000	92% increase
1973	784,000	80% increase
1960	715,000	64% increase
1974	703,000	62% increase

Figure 4

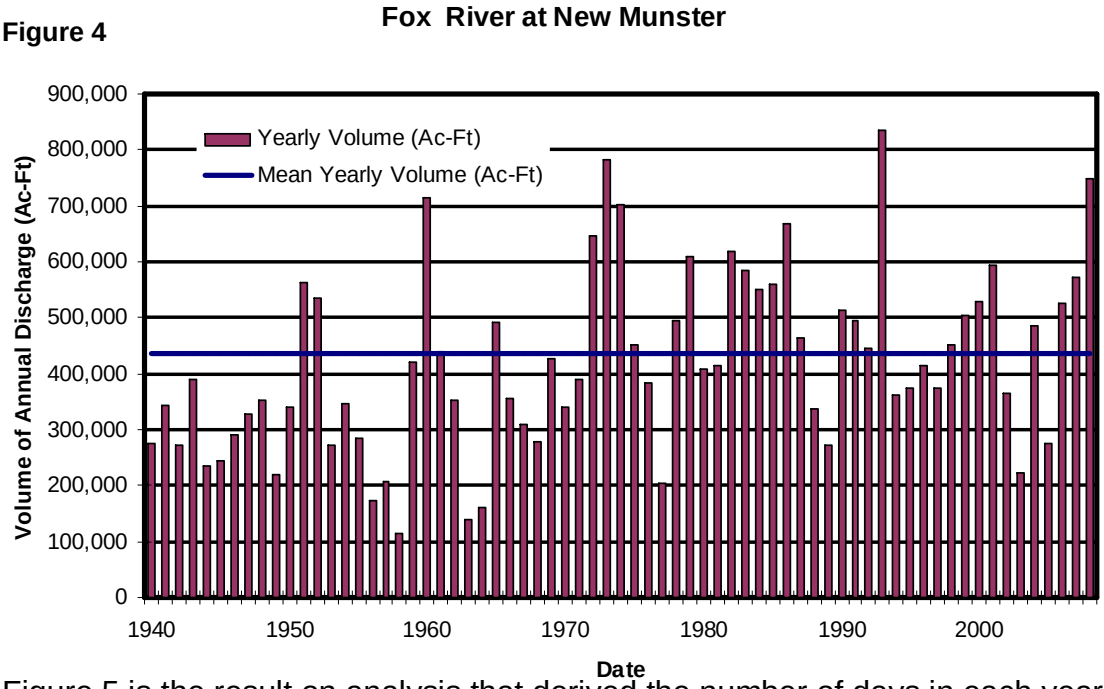


Figure 5 is the result on analysis that derived the number of days in each year where the flow at New Munster was above 3100 cfs. The value of 3100 cfs was chosen as the threshold of flooding

Figure 5